CLIPSSA
PACIFIC CLIMATE, LOCAL KNOWLEDGE AND ADAPTATION STRATEGIES

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METEO FRANCE À VOS CÔTÉS, DANS UN CLIMAT QUI CHANGE

Sheet 3

Better measuring for effective action

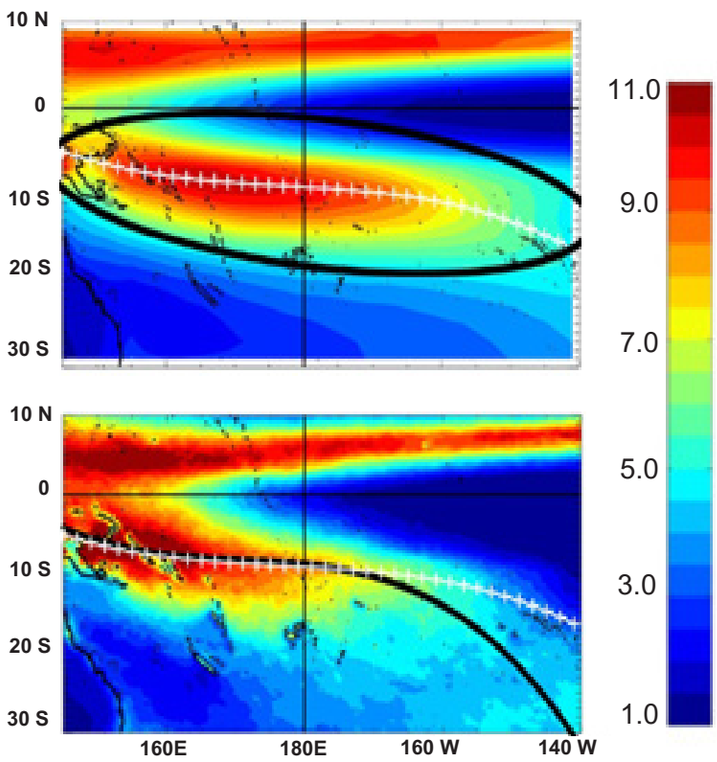
The CLIPSSA project's "climate" component aims to improve understanding of future climates and extreme weather phenomena in four South Pacific territories: French Polynesia, New Caledonia, Vanuatu, and Wallis-and-Futuna.

The gap: IPCC climate models are ill-suited to the South Pacific scales

Scientists currently use so-called 'global' climate models to predict future climate trends. These tools enable us to model various future scenarios for our planet, depending on the quantities of greenhouse gases we emit. **These are the scenarios and model results that feed into the IPCC reports.**

These models operate with large spatial grids, assuming that the climate is homogeneous over a distance of approximately 100 km. They are not precise enough to accurately represent small-scale phenomena, such as those affecting the Pacific islands. They also have limitations when it comes to simulating larger-scale phenomena, such as rainfall across the entire South Pacific.

Fig.1 /



Precipitation in (mm/day) in the South Pacific Convergence Zone (SPCZ) from IPCC climate models over the period 1995-2014.

The black ellipse represents the SPCZ. The white line with crosses represents the centre of the ellipse in climate models.

Actual rainfall data over the same period, at the exact location, observed by satellite.

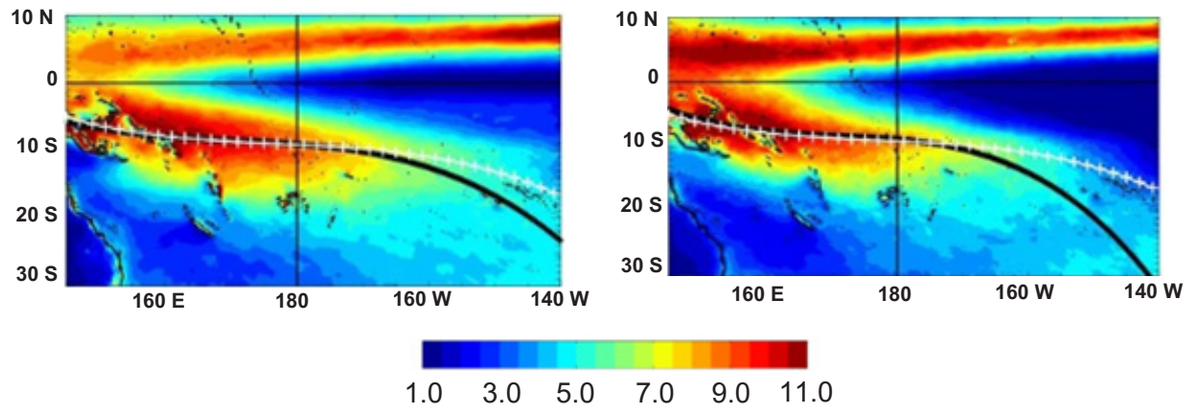
The black line represents the centre of the SPCZ in the observations. As shown in the figure above, the white line corresponds to the centre of the SPCZ in the IPCC models.

Objective 1: to improve models on the South Pacific scale

To correct these biases, CLIPSSA has reconstructed a climate model with a finer spatial grid of approximately 20 km, known as «ALADIN», based on the Météo-France regional climate model.

Fig.2 /

Precipitation (in mm/day) in the South Pacific Convergence Zone (SPCZ) from the ALADIN / CLIPSSA simulation	**Actual precipitation data over the same period, at the exact location, observed by satellite.**

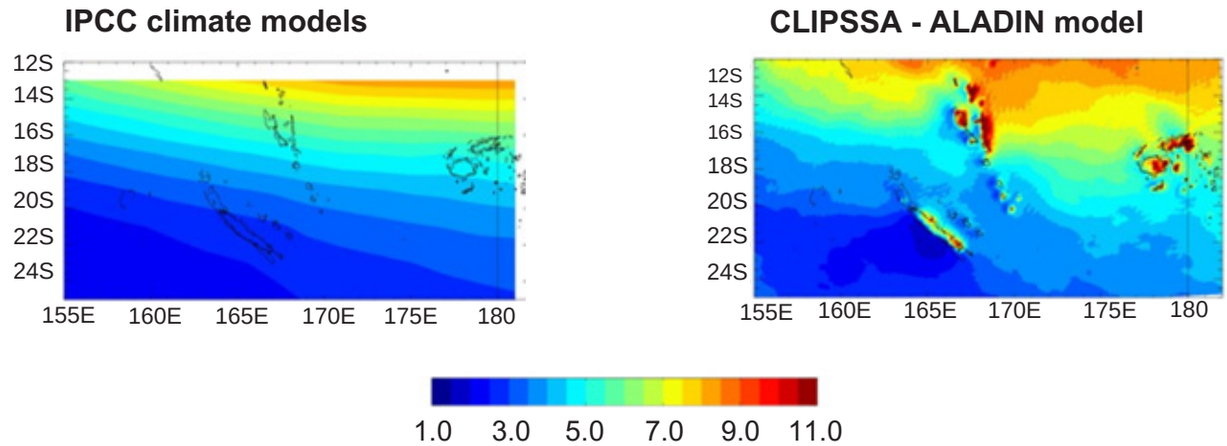


Key points to remember : It can be seen that at the island scale (New Caledonia in this case), rainfall simulation has significantly improved (with regards to the satellite observations) compared to what is obtained with the IPCC models. In this example, ALADIN / CLIPSSA provides an accurate representation of rainfall intensity in the South Pacific Convergence Zone.

The SPCZ is a crucial area for supplying water to the region's islands.

Objective 2 : Improve island-scale models

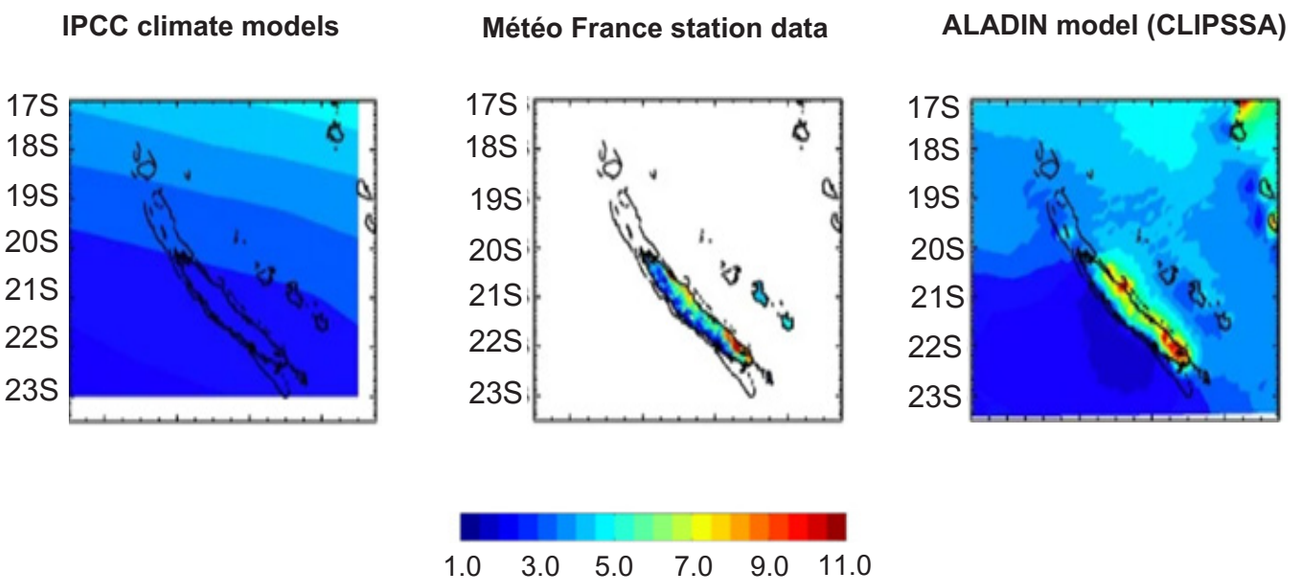
Fig.3 / Rainfall in mm/day around the Vanuatu region, New Caledonia



Key facts : With its 20 km grid, ALADIN reveals precipitation structures that are both very marked at the island level and absent from the IPCC models.

However, this 20 km scale remains unsatisfactory for representing all the details of climate on an island scale, as shown in figure 4 below.

Fig.4 / Focus on New Caledonia and comparison with weather station data



Conclusion

To extend beyond the regional scale represented by the 20 km ALADIN model and to better account for the relief-specific effects of the islands, a finer-scale model is needed. This is the function of the AROME model at 2.5 km.